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AS

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/369,767 08/06/99 NEUMANN H 10191/1146

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IM62/0718

EXAMINER

OLSEN, K

ART UNIT

PAPER NUMBER

1744

DATE MAILED:

07/18/00

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

# Office Action Summary

Application No.  
**09/369,767**

Applicant(s)  
**Neumann**

Examiner  
**Kaj Olsen**

Group Art Unit  
**1744**



☒ Responsive to communication(s) filed on Aug 6, 1999

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 35 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

## Disposition of Claim

☒ Claim(s) 1-6 is/are pending in the application

Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 1-6 is/are rejected.

☐ Claim(s) \_\_\_\_\_ is/are objected to.

☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☒ The drawing(s) filed on Aug 6, 1999 is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☒ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some\* ☒ One of the CERTIFIED copies of the priority documents have been

☒ received.

☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 3

☐ Interview Summary, PTO-413

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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## **DETAILED ACTION**

### ***Priority***

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Federal Republic of Germany on August 7, 1998. It is noted, however, that applicant has not filed a certified copy of the application as required by 35 U.S.C. 119(b).

### ***Drawings***

2. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: Ub. Correction is required.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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5. Claims 2-4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2 does not specify what the negative operating voltage is utilized for with respect to claim 1. The examiner has interpreted it as being connected to the negatively polarized electrode for the purpose of applying prior art.

In claim 4, it is unclear what is meant by the term "analyzing a negative probe voltage". The specification is equally vague about what is meant by this term. The specification teaches using the negative voltage as part of a limit current pump circuit. These circuits in the art utilize the measured current at a particular operating voltage (see Logothetis utilized below). How the limit pump circuit "analyzes" anything about the probe voltage is entirely unclear from the specification.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 5, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kato et al (4,909,922).

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Kato discloses an electrochemical sensor comprising a solid electrolyte element including a first electrode 22, a second electrode 24, and a heating element 36 where the second electrode is situated closer to the heating element than the first electrode (fig. 7). In addition, Kato discloses in the embodiment of fig. 7 coupling the second electrode to the lower potential terminal of the heater element. Although the lower potential element is not specified as being ground, it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize ground for the negative terminal of the heater because the ground potential is a convenient lower potential. Because the second electrode is grounded (as would have been obvious to do) and the first electrode would be at a lower potential than the second electrode due to the electromotive force induced by the difference in oxygen partial pressure between the reference and exhaust gas, said first electrode would inherently be negatively polarized. With respect to the size of the first and second electrodes, it would have been obvious to one of ordinary skill in the art at the time the invention was being made to make the electrodes to be the same size such that only one mask would be needed for the deposition of the electrodes to the respective laminate faces during manufacturing thereby simplifying sensor construction.

8. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kato ('922) in view of Logothetis et al ("High-temperature Oxygen Sensors", ACS Symposium Series)

Kato disclosed all the limitations of the claims, but did not explicitly recite the use of operating voltages for the electrodes. Kato instead disclosed utilizing the sensor for the measurement of the induced electromotive force. Logothetis discloses that there are a number of

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advantages to operating the sensor with an induced current (as opposed to relying on the electromotive force), including that the output of the sensor becomes linearly proportional to the oxygen concentration in the gas (fig. 1, 2 and the associated discussion). This allows for wide sensing range (electromotive based sensors are typically only sensitive at a particular air-fuel ratio) and it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teachings of Logothetis for the invention of Kato to provide a sensor giving an output linearly proportional to the measured gas concentration. The utilization of an impressed current would result in the application of a negative voltage to the first electrode because Kato already rendered obvious grounding the second electrode.

9. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stahl et al (4,400,260).

Stahl discloses an electrochemical sensor which comprises a solid electrolyte element 25 with first and second electrodes (27, 29 respectively), a heating element 30, where the second electrode 29 is situated closer to the heating element than the first electrode (fig. 4 and 5). Stahl also discloses connecting the second electrode 29 to a common element 33 with the negative lead of the heater. Although Stahl never discloses the common element to be at a ground potential, it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize ground because ground is a convenient potential available in the application of these electrochemical sensors (see rejection with Kato above). With respect to the polarization level of the first electrode, Stahl discloses operating the sensor in potentiometric mode (col.3,

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lines 11 and 12). In such an application, the polarization of the first electrode will be a function of the difference in oxygen levels in the gas being measured and in the reference passage. If the oxygen were greater in the measured portion than in the reference passage, the first electrode would be inherently negatively polarized. Because the claim does not specify an operating condition where the measured gas concentration is less than the reference gas composition, Stahl would inherently meet the polarization limitation when the measured gas is of a greater concentration than the reference gas.

10. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murase et al (5,413,683).

Murase discloses an electrochemical sensor which comprises a solid electrolyte element 14 which includes a first electrode 32, a second electrode 30. Although not shown in the figures, Murase further discloses the use of a heating means for operating the sensor at elevated temperatures (col. 12, lines 32-35). Murase does not explicitly identify where the heating means would be located on the disclosed sensor, but it would have been obvious to one of ordinary skill in the art at the time the invention was being made to place the heating means at either the top of the sensor shown in fig. 1 or at the bottom because heaters are typically placed on the extreme side of the sensors (see any of the enclosed art as example). Placing the heater at the bottom of the sensor in fig. 1 would have advantages over placing the heater at the top because placing the heater at the bottom would not interfere any of the electrodes (electrode 32 needs to remain exposed to the exhaust gas). In this case, the second electrode 30 would be situated closer to the

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heating element than the first electrode. In addition, Murase teaches coupling the second electrode to ground while negatively polarizing the first electrode by the application of a negative voltage with respect to ground. The negative voltage provided to the first electrode controls (powers) the measuring circuit (fig. 3 and associated discussion). The first and second electrodes have approximately the same sizes and the second electrode communicates with an atmosphere

16. With respect to the atmosphere being a reference atmosphere, the claim has not sufficiently defined the term reference in the claim in a manner which would obviate the examiner from interpreting said atmosphere as being a reference atmosphere.

### *Conclusion*

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Nishizawa et al, and Takahama et al.
12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (703) 305-0506.

If attempts to reach the examiner are unsuccessful, the examiner's supervisor, Mr. Robert Warden, can be reached at (703) 308-2920.

When filing a fax in Group 1700, please indicate in the header "Official" for papers that are to be entered into the file, and "Unofficial" for draft documents and other communications with the PTO that are not for entry into the file of this application. This will expedite processing of your papers. The fax number for this Group is (703) 305-7719.



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Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, whose telephone number is (703) 308-0661.

Kaj K. Olsen, Ph.D.



Patent Examiner

AU 1744



Terrence R. Till  
Primary Examiner